國立成功大學 76 學年度 電機工程研究所 碩士班入學考試(計算機概論試題) 共 1 頁 第 1 頁

1. (a) Determine the prime-implicants of the function: $F(w, x, y, z) = \sum(1,4,6,7,8,9,10,11,15)$ (18%) by using the tabulation method (Quine-McCluskey method)

   (b) Determine the essential prime-implicants by setting up the prime-implicant table for (a)

2. The 74L85IC is a 4-bit magnitude comparator as shown in Fig. 1. With this IC, (12%) numbers of greater length may be compared by connecting comparators in cascade. Using three 74L85ICs, obtain a circuit to compare two 12-bit numbers.

3. Give the control sequence for execution of the instruction 'Add contents of (18%) memory location addressed in memory direct mode (The address of the operand is given explicitly as a part of the instruction) to Register R1' by using the single-bus organization of the data paths inside the CPU as shown in Fig. 2

4. Explain (a) direct-mapping cache (b) associative-mapping cache (16%) (c) block-set-associative-mapping cache

5. Give an example to explain "Digital Search Trees" and "Tries" (16%)

6. A 8X8 array maze of 0s and 1s represent a maze in which a traveler (20%) must find a path from maze[1,1] to maze[8,8]. The traveler may move from a square into any adjacent square in the same row or column, but may not skip over any squares or move diagonally. In addition, the traveler may not move into any square that contains a 1, maze[1,1] and maze[8,8] contain 0s. Write a routine that accepts such a maze and either print a message that no path through the maze exists or prints a list of positions representing a path from [1,1] to [8,8]

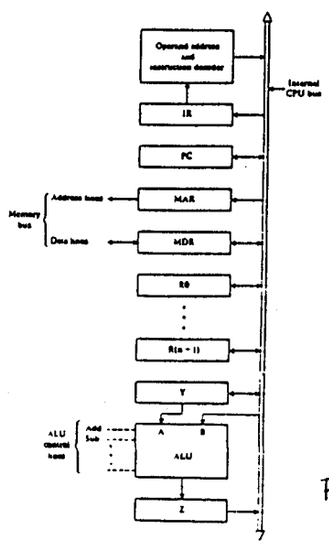

Fig. 2

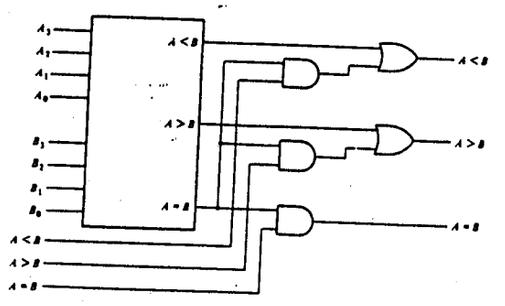

Fig. 1 74LS85IC (11 inputs, 3 outputs)